

California High-Speed Rail Authority



RFP No.: HSR 14-32

**Request for Proposals for Design-Build
Services for Construction Package 4**

**Book I, Part C.5
Scope of Work-Scope Elements Matrix**

Attachment 4 - Scope Elements Matrix

THE WORK SHALL INCLUDE, BUT IS NOT LIMITED TO, THE FOLLOWING WORK ELEMENTS

NO.	WORK ELEMENTS			CP4	REFERENCE	INSTRUCTIONS / DIRECTIONS
	DISCIPLINE	CATEGORY	ITEM			
	INFRASTRUCTURE					
1	SITE WORK	EARTHWORK	GRADING, SIDE SLOPES	YES		CONTRACTOR SHALL BE RESPONSIBLE FOR GRADING OF THE PROJECT ELEMENTS WHICH INCLUDE THE WORK OF HST AND THIRD PARTIES (UPRR, BNSF, CALTRANS, AND LOCAL JURISDICTIONS). CONTRACTOR SHALL MONITOR SETTLEMENTS OF FILL AREAS IN ACCORDANCE WITH DESIGN CRITERIA. CONTRACTOR SHALL PROVIDE PERMANENT SLOPE PROTECTION.
2	SITE WORK	EARTHWORK	SUBGRADE	YES		CONTRACTOR SHALL DESIGN AND INSTALL STABILITY MEASURES TO MEET MAINTENANCE REQUIREMENTS.
3	SITE WORK	EARTHWORK	COMPACTED FILL	YES		
4	SITE WORK	EARTHWORK	SUBBALLAST	NO	YES	CONTRACTOR SHALL ONLY INSTALL PROTECTIVE LAYER FOR PROTECTION OF PREPARED SUBGRADE. REFER TO SCOPE OF WORK.
5	SITE WORK	EARTHWORK	AC PROTECTIVE LAYER	YES		CONTRACTOR SHALL USE AC PROTECTION LAYER OVER TRACKWAY SUBGRADE.
6	SITE WORK	SPECIAL TRACKWORK	GRADING OF TRACKWAY IN AREAS OF SPECIAL TRACKWORK AND WAYSIDE EQUIPMENT	YES		CONTRACTOR SHALL INSTALL PROTECTIVE LAYER FOR PROTECTION OF PREPARED SUBGRADE IN AREAS/LIMITS OF SPECIAL TRACKWORK AND WAYSIDE EQUIPMENT THAT WILL BE INSTALLED LATER. REFER TO SCOPE OF WORK.
7	SITE WORK	EARTHWORK	ROCK CONTAINMENT/CATCHMENT	NO	YES	CONTRACTOR SHALL DESIGN AND CONSTRUCT ROCK CONTAINMENT/CATCHMENT (IF APPLICABLE) PER DESIGN CRITERIA.
8	GENERAL	GENERAL	DEMOLITION	YES		CONTRACTOR SHALL REFER TO SCOPE OF WORK.
9	SITE WORK	ACCESS CONTROL	FENCE	YES		CONTRACTOR SHALL FENCE AND FULLY SECURE THE AUTHORITY'S RIGHT-OF-WAY, EXCEPT ACCESS ROAD. CONTRACTOR SHALL CONSTRUCT PERMANENT/ULTIMATE FENCING. REFER TO DESIGN CRITERIA. THIRD PARTY FENCING SHALL BE DESIGNED PER THIRD PARTY REQUIREMENTS.
10	SITE WORK	ACCESS CONTROL	GATES (WALKING AND DRIVING)	YES		CONTRACTOR SHALL REFER TO SCOPE OF WORK.
11	SITE WORK	ACCESS ROAD	ACCESS ROADS	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT ACCESS ROADS (TO THE TOP OF AGGREGATE BASE). REFER TO SCOPE OF WORK AND DIRECTIVE DRAWINGS.
12	SITE WORK	ACCESS ROAD	COMPACTED SUBGRADE	YES		CONTRACTOR SHALL CONSTRUCT ACCESS ROADS TO THE TOP OF AGGREGATE BASE
13	SITE WORK	ACCESS ROAD	AGGREGATE BASE	YES		CONTRACTOR SHALL CONSTRUCT ACCESS ROADS TO THE TOP OF AGGREGATE BASE
14	SITE WORK	ACCESS ROAD	AGGREGATE SUBBASE	YES		CONTRACTOR SHALL CONSTRUCT ACCESS ROADS TO THE TOP OF AGGREGATE BASE
15	SITE WORK	ACCESS ROAD	ASPHALT CONCRETE	NO		CONTRACTOR SHALL CONSTRUCT ACCESS ROADS TO THE TOP OF AGGREGATE BASE.
16	SITE WORK	INTRUSION PROTECTION AND SAFETY BARRIER	CONCRETE BARRIERS, CONCRETE WALLS, METAL BEAM GUARD RAILS, AND EARTH BERMS OR DITCHES	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT THE INTRUSION AND SAFETY BARRIERS PER CHSTP, CALTRANS, AND OTHER PARTY'S DESIGN REQUIREMENTS. FOR COLLISION LOADS, REFER TO DESIGN CRITERIA. CONTRACTOR SHALL DESIGN AND CONSTRUCT THE INTRUSION BARRIER INTEGRAL TO THE RETAINING WALL IF THERE IS NOT SUFFICIENT SPACE TO CONSTRUCT AN INDEPENDANT INTRUSION PROTECTION BARRIER
17	SITE WORK	INTRUSION PROTECTION	HST PIER PROTECTION IN RAILROAD OR HIGHWAY RIGHT-OF-WAY	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT THE INTRUSION BARRIER. FOR COLLISION LOADS, REFER TO DESIGN CRITERIA. CONTRACTOR SHALL PROVIDE PIER PROTECTION FOR HST PIERS AND THIRD PARTY PIERS PER DESIGN CRITERIA AND THIRD PARTY REQUIREMENTS.
18	SITE WORK	INTRUSION PROTECTION	SOLID BARRIER ON OVERHEAD STRUCTURES OVER HST	YES		CONTRACTOR SHALL INSTALL AN OPAQUE SOLID BARRIER ON OVERHEAD STRUCTURES.
19	SITE WORK	SIGNAGE	FENCE SIGNAGE	YES		CONTRACTOR SHALL DESIGN AND INSTALL ACCESS CONTROL SIGNAGE. SIGNS SHALL BE ACCEPTED BY THE AUTHORITY BEFORE FABRICATION.
20	SITE WORK	SIGNAGE	SIGN, POLE, AND FOUNDATION	NO		
21	SITE WORK	SIGNAGE	MILE POST	NO		
22	SITE WORK	SURVEY	SITE SURVEY AND FIELD ENGINEERING	YES		CONTRACT SHALL PERFORM ALL SITE SURVEYS, FIELD ENGINEERING SURVEYS, AND SETTLEMENT OR OTHER MONITORING SURVEYS FOR THE PROJECT.
23	SITE WORK	ROADWAY WORK	MAINTENANCE OF TRAFFIC	YES		CONTRACTOR SHALL DESIGN AND INSTALL TEMPORARY AND PERMANENT TRAFFIC CONTROL DEVICES FOR HIGHWAY AND RAILROADS TO MAINTAIN TRAFFIC FLOW PER DESIGN CRITERIA, CALTRANS, AND THIRD PARTY REQUIREMENTS.
24	SITE WORK	ROADWAY WORK / STRUCTURES	GRADE SEPARATIONS (HST OVERPASS AND UNDERPASS)	YES		ROADWAY WORK SHALL BE DESIGNED AND CONSTRUCTED PER DESIGN CRITERIA AND THIRD PARTY REQUIREMENTS.
25	SITE WORK	ROADWAY WORK	NEW OR MODIFICATIONS TO EXISTING ROADS	YES		CONTRACTOR SHALL REFER TO SCOPE OF WORK.
26	SITE WORK	STRUCTURES	PEDESTRIAN BRIDGES	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT PEDESTRIAN BRIDGES PER DESIGN CRITERIA AND THIRD PARTY REQUIREMENTS.
27	SITE WORK	PARKING	FACILITY PARKING DETAIL	NO		
28	SITE WORK	ENVIRONMENTAL	CULVERTS FOR WILDLIFE CROSSINGS	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT WILDLIFE CROSSINGS AS INDICATED IN THE ENVIRONMENTAL DOCUMENTS.
29	SITE WORK	ENVIRONMENTAL	HAZARDOUS MATERIALS REMOVAL	YES		CONTRACTOR SHALL REFER TO SCOPE OF WORK.
30	SITE WORK	ENVIRONMENTAL	SOUND WALL AND FOUNDATION (AT-GRADE, CUT/FILL, RETAINED STRUCTURES)	NO	YES	CONTRACTOR SHALL DESIGN CHSR RETAINED STRUCTURES AND CONNECTION METHOD BETWEEN STRUCTURE AND SOUND WALL TO ACCOMMODATE FOR FUTURE INSTALLATION AND LOADING OF SOUND WALL PER DESIGN CRITERIA.
31	SITE WORK	ENVIRONMENTAL	LANDSCAPING	YES		CONTRACTOR SHALL REFER TO SCOPE OF WORK.
32	SITE WORK	TRACKWAY DRAINAGE	DRAIN AGGREGATE UNDER CABLE TROUGH	NO	YES	CONTRACTOR SHALL DESIGN FOR THE FINAL DRAINAGE SYSTEM, BUT CONSTRUCT WHAT IS NEEDED TO ACCOMMODATE TEMPORARY DRAINAGE CONDITIONS. REFER TO SCOPE OF WORK.
33	SITE WORK	TRACKWAY DRAINAGE	UNDERDRAIN SYSTEM	NO	YES	CONTRACTOR SHALL DESIGN FOR THE FINAL DRAINAGE SYSTEM, BUT CONSTRUCT WHAT IS NEEDED TO ACCOMMODATE TEMPORARY DRAINAGE CONDITIONS. REFER TO SCOPE OF WORK.
34	SITE WORK	TRACKWAY DRAINAGE	PERFORATED PIPE UNDERDRAIN (CLOSED DRAINAGE)	NO	YES	CONTRACTOR SHALL DESIGN FOR THE FINAL DRAINAGE SYSTEM, BUT CONSTRUCT WHAT IS NEEDED TO ACCOMMODATE TEMPORARY DRAINAGE CONDITIONS. REFER TO SCOPE OF WORK.
35	SITE WORK	TRACKWAY DRAINAGE	GEOTEXTILE FABRIC / GEOFABRIC	NO	YES	CONTRACTOR SHALL DESIGN FOR THE FINAL DRAINAGE SYSTEM, BUT CONSTRUCT WHAT IS NEEDED TO ACCOMMODATE TEMPORARY DRAINAGE CONDITIONS. REFER TO SCOPE OF WORK.
36	SITE WORK	TRACKWAY DRAINAGE	TRACKSIDE DITCH (OPEN CHANNEL DRAINAGE)	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT PERMANENT OPEN/SURFACE DRAINAGE. REFER TO SCOPE OF WORK.
37	SITE WORK	TRACKWAY DRAINAGE	DRAIN INLET	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT THE FINAL DRAINAGE SYSTEM. DRAIN INLETS SHALL ACCOMMODATE TEMPORARY AND FINAL DRAINAGE SYSTEM. REFER TO SCOPE OF WORK.
38	SITE WORK	TRACKWAY DRAINAGE	CONNECTION TO STORM DRAIN	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT FOR THE FINAL DRAINAGE SYSTEM AND CONNECT TO LOCAL STORM DRAIN SYSTEMS.
39	SITE WORK	TRACKWAY DRAINAGE	DETENTION BASIN	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT DETENTION BASINS TO ACCOMMODATE THE FINAL DRAINAGE SYSTEM.
40	SITE WORK	TRACKWAY DRAINAGE	SIPHONS	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT SIPHONS (IF REQUIRED).

Attachment 4 - Scope Elements Matrix

THE WORK SHALL INCLUDE, BUT IS NOT LIMITED TO, THE FOLLOWING WORK ELEMENTS

NO.	WORK ELEMENTS			CP4	REFERENCE	INSTRUCTIONS / DIRECTIONS
	DISCIPLINE	CATEGORY	ITEM			
41	SITE WORK	TRACKWAY DRAINAGE	ENERGY DISSIPATORS	NO	YES	
42	SITE WORK	DRAINAGE	CULVERTS	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT CULVERTS (IF REQUIRED).
43	SITE WORK	DRAINAGE	PUMP STATIONS (THIRD PARTY)	YES		CONTRACTOR SHALL DESIGN AND INSTALL PUMP STATIONS (AS NEEDED) FOR THIRD PARTY ENTITIES PER THAT ENTITY'S REQUIREMENTS.
44	SITE WORK	DRAINAGE	ROADWAY DRAINAGE	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT ROADWAY DRAINAGE SYSTEM PER JURISDICTIONAL REQUIREMENTS
45	SITE WORK	UTILITIES	WATERPROOFING SYSTEM AT STRUCTURE/UTILITY INTERFACES	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT STRUCTURE/UTILITY PENETRATIONS SO THAT IT DOES NOT COMPROMISE THE INTEGRITY OF WATERPROOFING OF THE STRUCTURE.
46	SITE WORK	UTILITIES	RELOCATION OF EXISTING UTILITIES	YES		CONTRACTOR SHALL REFER TO SCOPE OF WORK.
47	SITE WORK	UTILITIES	CORROSION CONTROL	YES		CONTRACTOR SHALL DESIGN AND INSTALL UTILITY CORROSION CONTROL, UNLESS PERFORMED BY THE UTILITY OWNER.
48	SITE WORK	UTILITIES	VENT PIPE RISER	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT VENT PIPE RISER, UNLESS PERFORMED BY THE UTILITY OWNER.
49	SITE WORK	UTILITIES	SHUTOFF VALVE	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT SHUTOFF VALVES PER THE REQUIREMENTS OF THE UTILITY OWNER (IF REQUIRED)
50	SITE WORK	UTILITIES	CASING	YES		CONTRACTOR SHALL DESIGN AND INSTALL CASINGS FOR ALL UTILITIES CROSSING UNDER HST RIGHT-OF-WAY, UNLESS PERFORMED BY THE UTILITY OWNER
51	SITE WORK	LOW VOLTAGE UNDER TRACK OR IN ROADWAY OVERHEAD STRUCTURES (SPARE CONDUITS)	SPARE LOW VOLTAGE CONDUITS AND MANHOLES (AT-GRADE AND ROADWAY OVERHEAD STRUCTURES)	YES		CONTRACTOR SHALL INSTALL 4-INCH SHEDULE 80 CONDUITS UNDER CHSR RIGHT-OF-WAY FOR FUTURE COMMUNICATION LINES PER THE FOLLOWING REQUIREMENTS: 1) FOUR SPARE CONDUITS WHERE EXISTING OVERHEAD COMMUNICATION LINES ARE RELOCATED UNDERGROUND 2) SIX SPARE CONDUITS WHERE PUBLIC ROADS ARE CLOSED AND ARE NOT GRADE SEPARATED ACROSS CHSR RIGHT-OF-WAY AND THERE ARE NO EXISTING COMMUNICATION LINES IN THE ROAD THAT IS CLOSED 3) FOUR SPARE CONDUITS IN CHSR CONSTRUCTED PUBLIC ROADWAY OVERHEAD STRUCTURES 4) SIX SPARE CONDUITS NO LESS THAN EVERY FIVE MILES PROVIDED THAT THERE IS NO OTHER SPARE CONDUIT INSTALLED IN THAT FIVE MILE STRECH OR THERE IS NO CHSR AERIAL STRUCTURE WHERE COMMUNICATION COMPANIES CAN ACCESS THE AREA UNDER THE AERIAL STRUCTURE. INSTALLATION OF SPARE CONDUITS SHALL BE PER CHSR DESIGN CRITERIA AND THE CONDUITS SHALL EXTEND 5 FEET BEYOND CHSR RIGHT-OF-WAY OR ROADWAY OVERCROSSING APPROACH SLAB AND TERMINATE IN A HANDHOLE OR A MANHOLE. TOP OF MANHOLE OR HANDHOLE SHALL BE COVERED AND 6 INCHES BELOW GRADE.
52	SITE WORK	LOW VOLTAGE UNDER TRACK CROSSING	LOW VOLTAGE UNDER TRACK CONDUITS IN DUCTBANKS AND MANHOLES (AT-GRADE, CUT/EMBANKMENT, AND RETAINED STRUCTURES)	YES		CONTRACTOR SHALL LOCATE, DESIGN AND CONSTRUCT LOW-VOLTAGE UNDER TRACK CONDUIT DUCTBANKS AND ACCOMPANYING MANHOLES TO SERVE TRACTION POWER FACILITIES, TRAIN CONTROL FACILITIES, STAND ALONE RADIO SITES, STATION PLATFORMS AND O&M FACILITIES. THE UNDER TRACK CROSSINGS GENERALLY COINCIDE WITH TRACTION POWER FACILITIES, TRAIN CONTROL FACILITIES, STAND ALONE RADIO SITES, STATION PLATFORMS AND O&M FACILITIES. PRELIMINARY DESIGN HAS LOCATED THESE FUTURE SITES AND FACILITIES. CONTRACTOR SHALL COORDINATE FINAL LAYOUTS, LOCATIONS, AND DESIGN WITH THE AUTHORITY. REFER TO THE SCOPE OF WORK AND COMMUNICATIONS CHAPTER OF THE DESIGN CRITERIA FOR DETAILS.
53	SITE WORK	LOW VOLTAGE UNDER GROUND CROSSING	LOW VOLTAGE UNDER GROUND CONDUITS IN DUCTBANKS AND MANHOLES (ALL LOCATIONS)	YES		CONTRACTOR SHALL LOCATE, DESIGN AND CONSTRUCT LOW-VOLTAGE UNDER GROUND CONDUIT DUCTBANKS AND ACCOMPANYING MANHOLES TO SERVE TRACTION POWER FACILITIES, TRAIN CONTROL FACILITIES, STAND ALONE RADIO SITES AND O&M FACILITIES SEPARATED FROM THE HSR TRACKWAY BY NON-HSR PROPERTY. THE UNDER GROUND CROSSINGS GENERALLY COINCIDE WITH FUTURE SYSTEMS, STATION, AND OTHER FACILITIES SEPARATED FROM THE HSR TRACKWAY. PRELIMINARY DESIGN HAS LOCATED THESE FUTURE SITES AND FACILITIES SEPARATED FROM THE HSR TRACKWAY BY NON-HSR PROPERTY. CONTRACTOR SHALL COORDINATE FINAL LAYOUTS, LOCATIONS, AND DESIGN WITH THE AUTHORITY. REFER TO THE SCOPE OF WORK AND COMMUNICATIONS CHAPTER OF THE DESIGN CRITERIA FOR DETAILS.
54	SITE WORK	25KV UNDER GROUND CROSSING	25KV UNDER GROUND CONDUITS IN DUCTBANKS AND MANHOLES (ALL LOCATIONS)	YES		CONTRACTOR SHALL LOCATE, DESIGN AND CONSTRUCT 25KV UNDER GROUND CONDUIT DUCTBANKS AND ACCOMPANYING MANHOLES TO SERVE TRACTION POWER FACILITIES SEPARATED FROM THE HSR TRACKWAY BY NON-HSR PROPERTY. THE 25KV UNDER GROUND CROSSINGS GENERALLY COINCIDE WITH FUTURE TRACTION POWER FACILITIES SEPARATED FROM THE HSR TRACKWAY. PRELIMINARY DESIGN HAS LOCATED FUTURE TRACTION POWER SITES SEPARATED FROM THE HSR TRACKWAY BY NON-HSR PROPERTY. CONTRACTOR SHALL COORDINATE FINAL LAYOUTS, LOCATIONS, AND DESIGN WITH THE AUTHORITY. REFER TO THE SCOPE OF WORK AND TRACTION POWER SUPPLY SYSTEM CHAPTER OF THE DESIGN CRITERIA FOR DETAILS.
55	SITE WORK	LOW VOLTAGE UNDER TRACK CROSSING	LOW VOLTAGE UNDER TRACK CONDUITS (AERIAL AND OTHER STRUCTURE)	NO	YES	CONTRACTOR SHALL NOT CONSTRUCT LOW-VOLTAGE UNDER TRACK CONDUIT DUCTBANKS AND MANHOLES FOR AERIAL, TRENCH, AND C&C STRUCTURES.
56	STRUCTURES	CABLE TROUGH	CABLE TROUGH - AERIAL STRUCTURE	NO	YES	CONTRACTOR SHALL DESIGN AND CONSTRUCT THE CABLE TROUGH WALL FOR THE CONCRETE PARAPET CONNECTION. REMOVABLE PRECAST COVERS ARE NOT INCLUDED. REFER TO SCOPE OF WORK TYPICAL SECTION EXHIBIT.
57	STRUCTURES	CABLE TROUGH	CABLE TROUGH - TRENCH AND C&C STRUCTURES	NO	YES	
58	STRUCTURES	CABLE TROUGH	CABLE TROUGH - CUT/FILL, RETAINED STRUCTURES	NO	YES	CONTRACTOR SHALL USE THE SAME-GRADED MATERIAL AS THE EMBANKMENT FOR EASE OF FUTURE CABLE TROUGH INSTALLATION.
59	STRUCTURES	CABLE TROUGH	CABLE TROUGH TRANSITIONS	NO	YES	
60	STRUCTURES	RETAINING WALL	RETAINING WALL	YES		CONTRACTOR SHALL REFER TO SCOPE OF WORK.
61	STRUCTURES	RETAINING WALL	FALL PROTECTION	YES		CONTRACTOR SHALL ENSURE FALL PROTECTION DESIGN MEETS MINIMUM REQUIREMENTS PER DESIGN CRITERIA.
62	STRUCTURES	RETAINING WALL	FLOOD PROTECTION / INTRUSION PROTECTION	NO		
63	STRUCTURES	RETAINING WALL	RETAINING WALL DRAINAGE	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT PERMANENT/ULTIMATE DRAINAGE SYSTEM FOR THE RETAINING WALL.
64	STRUCTURES	RETAINING WALL	TOP OF RETAINING WALL GUTTER	YES		FOR RETAINED CUT SECTIONS
65	STRUCTURES	RETAINING WALL	CONTINUOUS DRAINAGE BLANKET BEHIND RETAINED CUT WALL	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT PERMANENT/ULTIMATE DRAINAGE SYSTEM FOR THE RETAINING WALL.
66	STRUCTURES	RETAINING WALL	PERFORATED UNDERDRAIN AT THE BOTTOM OF WALL BEHIND THE FILL	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT PERMANENT/ULTIMATE DRAINAGE SYSTEM FOR THE RETAINING WALL.
67	STRUCTURES	RETAINING WALL	WEEP HOLES	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT PERMANENT/ULTIMATE DRAINAGE SYSTEM FOR THE RETAINING WALL.

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NO.	WORK ELEMENTS			CP4	REFERENCE	INSTRUCTIONS / DIRECTIONS
	DISCIPLINE	CATEGORY	ITEM			
68	AERIAL STRUC.	GENERAL	TRACKSIDE CABLE TROUGH WALL AND CABLE TROUGH WALL ADJACENT TO PARAPET WALL AND SLEEVES	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT DERAILMENT PROTECTION WALLS PER LOAD REQUIREMENTS IN THE DESIGN CRITERIA AND AS SHOWN ON DIRECTIVE DRAWINGS. DERAILMENT PROTECTION WALLS SHALL INCLUDE THE CABLE TROUGH SIDE WALL ON AERIAL STRUCTURES. REFER TO SCOPE OF WORK TYPICAL SECTION EXHIBIT.
69	AERIAL STRUC.	GENERAL	CONCRETE PARAPET	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT CONCRETE PARAPET PER DESIGN CRITERIA AND DIRECTIVE DRAWINGS.
70	AERIAL STRUC.	SOUND WALL	SOUND WALL	NO	YES	CONTRACTOR SHALL DESIGN CHSR BRIDGES, AERIAL STRUCTURES, AND GRADE SEPARATIONS INCLUDING PARAPET WALLS AND CONNECTION METHOD BETWEEN PARAPET AND SOUND WALL TO ACCOMMODATE FOR FUTURE INSTALLATION AND LOADING OF SOUND WALL PER DESIGN CRITERIA.
71	AERIAL STRUC.	GENERAL	EXPANSION JOINT	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT PER DESIGN CRITERIA
72	AERIAL STRUC.	GENERAL	BEARINGS, RESTRAINERS, AND TIEDOWN DEVICE	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT PER DESIGN CRITERIA
73	AERIAL STRUC.	GENERAL	SHEAR KEY	YES		
74	AERIAL STRUC.	SUPERSTRUCTURE	CONCRETE OR STEEL GIRDER	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT PER DESIGN CRITERIA
75	AERIAL STRUC.	SUPERSTRUCTURE	SHEAR CONNECTOR OR REINFORCEMENT IN CONCRETE SLAB	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT PER DIRECTICE DRAWINGS AND DESIGN CRITERIA
76	AERIAL STRUC.	SPECIAL TRACKWORK	TURNOUTS AND CROSSOVERS	NO	YES	CONTRACTOR SHALL DESIGN THE AERIAL STRUCTURE TO CONSIDER THE EFFECTS OF TURNOUTS AND CROSSOVERS ON THE STRUCTURE JOINTS.
77	AERIAL STRUC.	OCS FOUNDATION	SLEEVES AT OVERHANG OF BOX GIRDERS	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT SLEEVES AT OVERHANG OF BOX GIRDERS SPACED AT 30 FEET MAXIMUM FOR FUTURE OVERHEAD CATENARY SYSTEM POLE FOUNDATIONS AND CONDUITS FOR CABLE ROUTING
78	AERIAL STRUC.	GANTRY FOUNDATION	STRUCTURAL ACCOMMODATIONS FOR FUTURE GANTRY INSTALLATION	NO	YES	CONTRACTOR SHALL DESIGN THE AERIAL STRUCTURE CONSIDERING THE SPATIAL IMPACTS AND STRUCTURAL LOADING OF TRACTION POWER GANTRIES. TRACTION POWER GANTRIES ARE GENERALLY LOCATED AT THE TRACKWAY NEAR TRACTION POWER FACILITIES. FUTURE TRACTION POWER SITES ARE SHOWN IN THE PRELIMINARY DESIGN. CONTRACTOR SHALL COORDINATE GANTRY PROVISIONS, FINAL LOCATIONS, AND DESIGN WITH THE AUTHORITY.
79	AERIAL STRUC.	SUBSTRUCTURE	PIER CAP, PIER, AND FOUNDATION	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT PER DESIGN CRITERIA
80	AERIAL STRUC.	DRAINAGE	DRAINAGE INLET, WEIR, DOWNSPOUT, DRAINAGE CLEANOUT, CONNECTION TO EXISTING OR PROPOSED DRAINAGE SYSTEM	YES		CONTRACTOR SHALL DESIGN AERIAL STRUCTURE DRAINAGE SYSTEM PER DESIGN CRITERIA AND DIRECTIVE DRAWINGS. CONTRACTOR SHALL DESIGN AND INSTALL THE DRAIN PIPE (EMBEDDED IN PIER) AND SHALL NOT INTERRUPT THE SUBSTRUCTURE REINFORCEMENT, ESPECIALLY IN THE PLASTIC HINGE POINT. CONTRACTOR SHALL CONNECT THE DRAIN PIPE TO A DRAINAGE SYSTEM.
81	AERIAL STRUC.	FIXED EQUIPMENT	SURFACE MOUNTED PULL BOXES	NO		
82	AERIAL STRUC.	FIXED EQUIPMENT	EXPOSED CONDUITS, EXPANSION AND DEFLECTION FITTINGS, SUPPORTING STEEL AND HARDWARE, EXTERIOR AESTHETIC CLADDING SYSTEM	NO		
83	AERIAL STRUC.	CONDUIT RISER	EMBEDMENT FOR CONDUIT RISER	YES		
84	TRENCH	GENERAL	FALL PROTECTION	NO		
85	TRENCH	GENERAL	FLOOD PROTECTION / INTRUSION PROTECTION	NO		
86	TRENCH	GENERAL	STRUT	NO		
87	TRENCH	STRUCTURES / UTILITY / CIVIL	INTERMITTENT ROOF SLAB FOR UTILITY AND ROADWAY CROSSING	NO		
88	TRENCH	CONDUIT RISER	EMBEDMENT FOR CONDUIT RISER	NO		
89	TRENCH / C&C	GENERAL	NICHES	NO		
90	TRENCH / C&C	GENERAL	BASE SLAB	NO		
91	TRENCH / C&C	GENERAL	WALKWAY AND INVERT SLAB	NO		
92	TRENCH / C&C	GENERAL	INTEGRAL CONCRETE WALL	NO		
93	TRENCH / C&C	GENERAL	COMPACTED BACKFILL / STRUCTURAL FILL	NO		
94	TRENCH / C&C	GENERAL	CONSTRUCTION JOINT WITH WATERSTOP	NO		
95	TRENCH / C&C	GENERAL	FULL PERIMETER WATERPROOFING	NO		
96	TRENCH / C&C	GENERAL	DEWATERING	NO		
97	TRENCH / C&C	FIXED EQUIPMENT	LIGHT FIXTURES	NO		
98	TRENCH / C&C	FIXED EQUIPMENT	WALKWAY HANDRAILS	NO		
99	TRENCH / C&C	FIXED EQUIPMENT	EMBEDDED CONDUITS IN WALKWAY AND INVERT SLAB FOR CABLE ROUTING	NO		
100	TRENCH / C&C	DRAINAGE	DRAIN AND INLET	NO		
101	TRENCH / C&C	DRAINAGE	INVERT FOR TRACKBED	NO		
102	TRENCH / C&C	DRAINAGE	SUMP PUMP	NO		
103	C&C	GENERAL	VENTILATION STRUCTURE	NO		
104	C&C	GENERAL	PORTAL FACILITY	NO		
105	STATIONS	STRUCTURE	PASSENGER STATION BUILDING	NO		
106	STATIONS	GENERAL	STATION FURNITURES, FIXTURES, AND EQUIPMENT	NO		
107	STATIONS	WALL	SCREEN WALL	NO		
108	STATIONS	TRACKWAY DRAINAGE	DRAINAGE INLET	YES		REFER TO AERIAL STRUCTURE DRAINAGE
109	STATIONS	PLATFORM	STATION PLATFORM	NO		
110	TRACK	GENERAL	RAIL AND FASTENERS	NO		
111	TRACK	NON-BALLASTED	NON-BALLASTED TRACK	NO	YES	
112	TRACK	NON-BALLASTED	AC LAYER	NO		
113	TRACK	NON-BALLASTED	SLEEVES FOR CABLE ROUTING	NO		
114	TRACK	BALLASTED	BALLAST (INCLUDING BALLAST BELOW TIE)	NO	YES	
115	TRACK	BALLASTED	CONCRETE TIES	NO		
116	TRACK	BALLASTED	WOOD TIES	NO		
117	TRACK	BALLASTED	EMBEDDED CONDUITS WITHIN BALLAST TRACKWORK	NO		
118	TRACK	TRACKWORK	BUMPING POSTS	NO		

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NO.	WORK ELEMENTS			CP4	REFERENCE	INSTRUCTIONS / DIRECTIONS
	DISCIPLINE	CATEGORY	ITEM			
119	TRACK	TRACKWORK	DERAILS	NO		
120	TRACK	TRACKWORK	STRETCHER BARS	NO		
121	TRACK	TRACKWORK	ATC CROSSING BONDING	NO		
122	TRACK	SPECIAL TRACKWORK	SWITCH RAILS	NO		
123	TRACK	SPECIAL TRACKWORK	TURNOUTS AND CROSSOVERS	NO	YES	CONTRACTOR SHALL DESIGN FOR THE LOCATION AND SPACE REQUIREMENTS OF OPERATING MECHANISMS, SIGNAL EQUIPMENT, AND OTHER WAYSIDE FACILITIES. CONTRACTOR SHALL DESIGN THE FUTURE LOCATION FOR EASE OF ACCESS TO THE WAYSIDE FACILITIES.
124	TRACK	SPECIAL TRACKWORK	TURNOUT GUARD RAILS (OR CHECK RAILS)	NO		
125	TRACK	SPECIAL TRACKWORK	SWITCH MACHINES	NO	YES	CONTRACTOR SHALL DESIGN THE FUTURE LOCATION OF SWITCH MACHINES FOR EASE OF ACCESS TO THE WAYSIDE FACILITIES.
126	TRACK	SPECIAL TRACKWORK	SWITCH HEATERS	NO		
SYSTEMS						
127	OCS	ASSEMBLY	OCS POLE AND FOUNDATION	NO	YES	CONTRACTOR SHALL DESIGN MECHANICALLY STABILIZED EARTH (MSE)RETAINED FILL STRUCTURES WITH SPATIAL AND STRUCTURAL LOADING PROVISIONS FOR THE FUTURE OVERHEAD CATENARY SYSTEM POLE FOUNDATIONS SPACED AT MAXIMUM 30 FEET. CONTRACTOR SHALL COORDINATE THESE PROVISIONS WITH THE AUTHORITY.
128	OCS	ASSEMBLY	OCS ASSEMBLY	NO	YES	CONTRACTOR SHALL MAKE PROVISIONS FOR WALL-MOUNTED OCS CANTILEVER ARMS AT TRENCH WALLS THAT ARE GREATER THAN OR EQUAL TO 20’ HEIGHT ABOVE TOP OF RAIL. THESE PROVISIONS SHALL BE SPACED AT MAXIMUM 30’. CONTRACTOR SHALL COORDINATE THESE PROVISIONS WITH THE AUTHORITY. TYPICAL LOADING AND MOUNTING TO BE CONVEYED DURING INTERFACE AND INTEGRATION WORKSHOPS.
129	OCS	ASSEMBLY	OCS POLE NUMBER PLATE	NO		
130	OCS	ASSEMBLY	OCS CONTACT WIRE	NO		
131	OCS	ASSEMBLY	MESSENGER WIRE	NO		
132	OCS	ASSEMBLY	NEGATIVE FEEDER WIRE	NO		
133	OCS	ASSEMBLY	STATIC WIRE	NO		
134	OCS	ASSEMBLY	PORTAL STRUCTURE OPENING	NO		
135	OCS	BALANCE WEIGHT	POLE BRACKET	NO		
136	OCS	BALANCE WEIGHT	CABLE TERMINATION CLAMP	NO		
137	OCS	BALANCE WEIGHT	OCS BALANCE WEIGHT POLE	NO		
138	OCS	BALANCE WEIGHT	TURNBUCKLE	NO		
139	OCS	BALANCE WEIGHT	ANCHOR U-BOLT	NO		
140	OCS	BALANCE WEIGHT	CATENARY INSULATED TERMINATION	NO		
141	OCS	BALANCE WEIGHT	POLE DOWN GUY BRACKET	NO		
142	OCS	BALANCE WEIGHT	BALANCE WEIGHT ANCHOR ASSEMBLY	NO		
143	OCS	L.V. DISTRIBUTION	25KV/480V TRANSFORMER	NO		
144	OCS	L.V. DISTRIBUTION	WEATHER HEAD	NO		
145	OCS	L.V. DISTRIBUTION	L.V. DISCONNECT SWITCH AND MOUNTING HARDWARE	NO		
146	OCS	L.V. DISTRIBUTION	CONDUCTORS AND MOUNTING HARDWARE	NO		
147	OCS	L.V. DISTRIBUTION	EXPOSED CONDUIT EXTENSIONS	NO		
148	OCS	GROUNDING & BONDING	GROUNDING AND BONDING ARRANGEMENT FOR OVERHEAD BRIDGES	YES		CONTRACTOR SHALL REFER TO SCOPE OF WORK.
149	OCS	GROUNDING & BONDING	GROUNDING AND BONDING ARRANGEMENT FOR HST STRUCTURES (I.E., AERIAL STRUCTURE, TRENCH, FENCE, ETC.)	YES		CONTRACTOR SHALL REFER TO SCOPE OF WORK.
150	OCS	GROUNDING & BONDING	OCS FLASH PLATES, STEEL STRIP OR ANGLE SECTION, PROTECTION PANELS, FLASH PLATES ON NEW OR EXISTING OVERHEAD BRIDGES	NO	YES	CONTRACTOR SHALL REFER TO SCOPE OF WORK.
151	OCS / TPS	OCS FEEDER	MAIN GANTRY AND FOUNDATION	NO	YES	
152	OCS / TPS	OCS FEEDER	STRAIN GANTRY AND FOUNDATION	NO	YES	
153	OCS / TPS	OCS FEEDER	ACROSS TRACK OCS CATENARY/FEEDER WIRE TO STRAIN GANTRY	NO		
154	OCS / TPS	OCS FEEDER	STANDOFF INSULATOR	NO		
155	OCS / TPS	OCS FEEDER	SURGE ARRESTER	NO		
156	OCS / TPS	OCS FEEDER	POTENTIAL TRANSFORMER	NO		
157	OCS / TPS	OCS FEEDER	ALUMINUM BUSBAR	NO		
158	OCS / TPS	OCS FEEDER	MOTOR OPERATED DISCONNECT SWITCH ASSEMBLY	NO		
159	TPS	FACILITIES	SUBSTATION	NO	YES	
160	TPS	FACILITIES	SWITCHING STATION	NO	YES	
161	TPS	FACILITIES	PARALLELING STATION	NO	YES	
162	TPS	FACILITIES	WAYSIDE POWER CONTROL CUBICLE	NO		
163	MOD	GROUND SWITCH	DISCONNECT SWITCH, ROD AND MOUNTING HARDWARE	NO		
164	MOD	GROUND SWITCH	2X25KV DISCONNECT SWITCH	NO		
165	MOD	GROUND SWITCH	SWITCH SUPPORT	NO		
166	MOD	GROUND SWITCH	ADJUSTABLE BRACE	NO		
167	MOD	GROUND SWITCH	DRIVE PIPE	NO		
168	MOD	GROUND SWITCH	GROUND WORKING PLATFORM AND GROUND CONNECTION	NO		
169	ATC	WAYSIDE	TRAIN CONTROL HOUSES	NO	YES	
170	ATC	WAYSIDE	DWARF SIGNALS	NO		

THE WORK SHALL INCLUDE, BUT IS NOT LIMITED TO, THE FOLLOWING WORK ELEMENTS

NO.	DISCIPLINE	CATEGORY	WORK ELEMENTS	CP4	REFERENCE	INSTRUCTIONS / DIRECTIONS
			ITEM			
171	ATC	TRACKWORK	IMPEDANCE BOND	NO		
172	ATC	TRACK CIRCUIT	1-2" CONDUIT TO POWER COMPARTMENT	NO		
173	ATC	TRACK CIRCUIT	2" CONDUIT TO ATC/COMMS COMPARTMENT	NO		
174	ATC	TRACK CIRCUIT	CONDUIT EXTENSION	NO		
175	ATC	TRACK CIRCUIT	WORKING PLATFORM	NO		
176	ATC	TRACK CIRCUIT	GROUND ROD, CONDUCTOR, AND TERMINATION HARDWARE	NO		
177	ATC	TRACK CIRCUIT	POWER COMPARTMENT	NO		
178	ATC	TRACK CIRCUIT	EQUIPMENT CASE FOUNDATION	NO		
179	ATC	TRANSPONDER	ATC TRANSPONDERS AND MOUNTING HARDWARE	NO		
180	ATC	SPECIAL TRACKWORK	SWITCH MACHINE AND RODS	NO		
181	ATC	SPECIAL TRACKWORK	ATC SIGNAL	NO		
182	ATC / COMM	TRACK CIRCUIT	ATC EQUIPMENT CASE	NO		
183	COMM	COMM	STAND-ALONE RADIO SITES	NO	YES	
184	COMM	COMM	COMMUNICATION SHELTERS	NO	YES	
185	COMM	TRENCH	RADIO (LATERAL) COMMUNICATION CABLES TO RADIO EQUIPMENT	NO		
186	COMM	TRENCH	TRACKSIDE RADIO (LONGITUDINAL) CABLES	NO		
187	COMM	SCS	SCS EQUIPMENT CASE AND FOUNDATION	NO		
188	COMM	SCS	1-2" CONDUIT TO POWER COMPARTMENT	NO		
189	COMM	SCS	2" CONDUIT TO ATC/COMMS COMPARTMENT	NO		
190	COMM	SCS	SCADA INTERFACE CABINET	NO		
	OPERATIONS & MAINTENANCE					
191	O&M	O&M	LIGHTING REQUIREMENTS AND PUMPS	NO		CONTRACTOR SHALL BE RESPONSIBLE FOR DESIGN AND CONSTRUCTION OF TEMPORARY FACILITIES THAT NEED TO BE LEFT IN PLACE AFTER THE COMPLETION OF THE CONTRACT. REFER TO SCOPE OF WORK.
192	O&M	INTRUSION	INTRUSION DETECTION	NO		
193	O&M	DERAILMENT	POWER OPERATED DERAIL DEVICES	NO		
194	O&M	FACILITIES	OPERATIONS CONTROL CENTER	NO		
195	O&M	FACILITIES	REGIONAL CONTROL CENTER	NO		
196	O&M	FACILITIES	YARD CONTROL CENTER	NO		
197	O&M	FACILITIES	YARD CONTROL TOWER EQUIPMENT ROOM	NO		
198	O&M	FACILITIES	TERMINAL CONTROL CENTER	NO		
199	O&M	FACILITIES	STATION CONTROL ROOM	NO		
200	O&M	FACILITIES	INCIDENT COMMAND POST	NO		
201	O&M	FACILITIES	HEAVY MAINTENANCE FACILITY	NO		
202	O&M	FACILITIES	OVERNIGHT LAYUP FACILITY	NO		
203	O&M	FACILITIES	PERIODIC INSPECTION FACILITY	NO		
204	O&M	FACILITIES	ROLLING STOCK MAINTENANCE	NO		
205	O&M	FACILITIES	MAINTENANCE OF INFRASTRUCTURE FACILITY	NO	YES	CONTRACTOR SHALL DESIGN TO ACCOMMODATE FUTURE MAINTENANCE OF INFRASTRUCTURE FACILITY.
206	O&M	FACILITIES	MAINTENANCE OF INFRASTRUCTURE SIDING	NO		
207	O&M	GENERAL	EXIT STAIRWAYS	YES		REFER TO SYSTEM SAFETY AND SECURITY CHAPTER OF THE DESIGN CRITERIA FOR DETAILS.